

CHAPTER I

INTRODUCTION

1.1 Background to The Research

The development of civil engineering and planning technology in soil mechanics are experiencing rapid revolution in the 2000 AD to solve many problems of land and many type of soils, as age advances in the field of building construction technology is also experiencing rapid development in the field of geotechnical engineering including technology. Footing is a part of foundation, The foundations are located inside the ground to install the building with the ground. To design the safety footing, should be able to estimate and calculate the stability of footing. Which need to be considered to calculate the stability of an footing is an footing shear stability and stability of the soil.

It is well known that there are many ways to speed up the calculation and reduce errors when footing stability of the program account, and take in the planning of gravity is also essential in the design of footing, and the plugin in the design is the Geo 5.

Application Geo5 is a series of programs designed to solve various geotechnical problems. In this program in addition to design and calculate the footing, also can be used to calculate and design foundation, excavation, soil degradation, soil stability, and digital terrain modeling. The workings of this program is to choose the form of a footing to be used, then enter material which would be a burden on the footing next the program will analyze the safety of the footing .

1.2. Statement of The Research

Based on the background of the problems described above, the statement of the research as below:

1. Need to conduct a research on stability analysis of footing foundation

2. Finding the value of safety factors for footing using Application Geo 5 data to obtain the smallest value of the safety.

1.3 The Research Objective

The objective of this research is as below:

1. Redesign and calculate the safety factor using manual calculation.
2. Find the value of safety factor of footing foundation using Geo5 program.
3. Comparing the result of safety factor between manual method and Geo 5 program

1.4 Benefit of The Research

The benefit of designing footing foundation using geo5 program is as below:

1. To find out more in the footing stability analysis .
2. Benefit general, to provide knowledge about the new program in the field of geotechnical particularly among students of civil engineering, University of Muhammadiyah Surakarta, namely Geo5 program. As well as providing an alternative plan dimensions and stability of footing faster and precise.
3. To determine the extent of using the program Geo 5 to design footing. So that program can be applied in the field.

1.5. Limitation of The Research

Order to this research will be focused on the problem, it is necessary to add any boundaries. The boundaries problem as below:

1. The design of footing is calculated based on data taken from Hj Sudalmiyah Rais UMS Mosque
2. Safety factor for those stabilities value, and consider taken 2. The data on laboratory soil test results, it can be seen

$$1 \quad \gamma \quad : 1.7 \text{ t/ m}^3$$

$$2 \quad \gamma'_{\text{sat}} \quad : 1.9 \text{ t/ m}^3$$

- 3. Footing size : Width : 2.5 M
Length : 2.5 M
- 4. Ground water level : 0.35 M
- 5. Type of soil : homogeneous clay
- 6. Cu : 58.6 Kg / cm²
- 7. P load : 1537 kN

8 Research Tools 1. Geo 5 v19

This program is a computer program used for calculation, stability controlling, vizualization, and this program make the designer easy for simply entering the existing data of soil and dimension of footing foundation .

which are desired. Then the program will automatically analyzing and shown into a programming language that is easy to understand.

2. AutoCAD 2015

This program is used to draw the structure details that required and to draw structure in design and calculation of structure dimension.

3. Microsoft Office 2007

This program is used to create reports, charts, flowcharts, analysis data, and table.

1.6. The Originality of Research

There are several research similar to this research, however have similarities and differences with this research. Similarities and differences in this research by similar studies are as follows:

Table I.1. Similarities and Differences with Similar Research

NO	Title	Researcher	The purpose	Scope of problem
1	Soil Nailing Design By Using Geo5 Program	Sri Ardiyati	<p>1.Design the dimensions and stability of the soil nailing against the dangers of the overthrow and collapse shift with manual methods. Then design by using Geo5 program.</p> <p>2. The using geo5 Program for find safety value from thestability of gravitation wall</p>	<p>1. this design is done in Piyungan road the border from Gunung Kidul</p> <p>2. in this research it uses soil nailing for reinforcement of the slope, structure of soil nailing is from steel.</p>
2	Design abutment by using Geo 5 program	Abdulrahman Yassen	<p>1. Design the dimensions and stability of the footing against the dangers of the overthrow and collapse shift with manual methods. Then design by using Geo 5 program.</p> <p>2. The using Geo 5 program for find safety value from the stability of footing foundation</p>	<p>1. this design is done in Piyungan road-the border from Gunung Kidul</p> <p>2. in this research it uses soil retaining wall type concrete reinforcement by using Reinforced concrete cantilever walls) which uses the structure from steel.</p>
3	Footing foundation Design By Using Geo5Program	Tamer ayaydeh	<p>1. Design the dimensions and stability of the footing against the dangers of the overthrow and collapse shift with manual methods. Then design by using Geo 5 program.</p> <p>2. The using Geo 5 program for find safety value from the stability of footing foundation .</p>	<p>1. this design is done in campus 2 Mohammadiyah UMS (Hj Sudalmiyah Rais UMS Mosque)</p> <p>2. in this research it uses footing for stabilities value,structure of footing foundation is from concrete.</p>

This research is focused on designing footing foundation for Straight area, but both using the same program namely Geo5 program to solving the problem and reanalyzed with manual methods to determine the strength of foundation reinforcement.